mikroBoard for ARM 64-pin™

User manual

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Development system

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Nebojsa Matic
General Manager

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1. General information

MikroBoard for ARM 64-pin is primarily intended to be connected to the EasyARM v6 development system but can also be used as a stand-alone device. The board features the LPC2148 microcontroller, flash module, USB connectors, microSD connector, JTAG connector, USB UART, voltage regulator and connectors that enable connection with a development system.

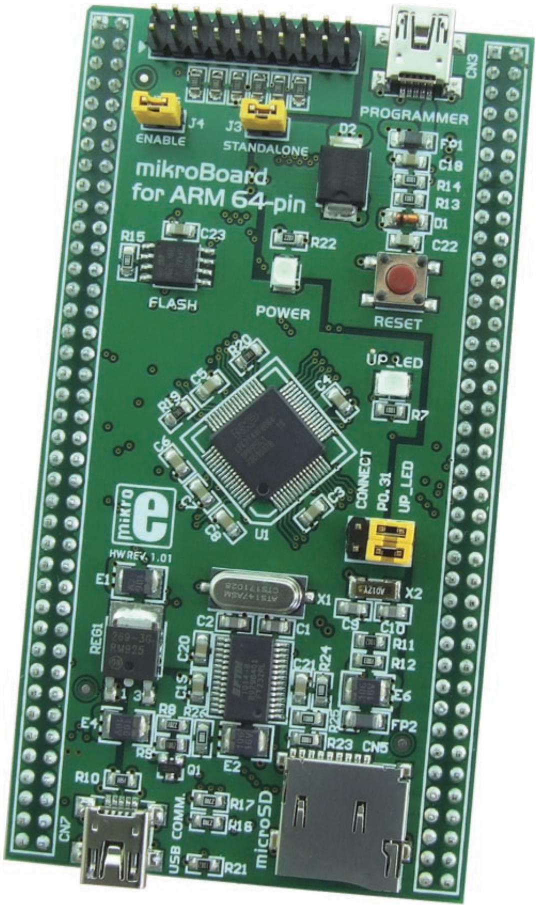


Figure 1-1: mikroBoard for ARM 64-pin

2. LPC2148 microcontroller

The LPC2148 microcontroller in 64-pin LQFP package is soldered on the mikroBoard for ARM 64-pin. Some of its key features are:

- 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package
- 40 kB of on-chip static RAM and 512 kB of on-chip flash memory. 128-bit wide interface/ accelerator enables high-speed 60 MHz operation
- In-System Programming/In-Application Programming (ISP/IAP) via on-chip boot loader software. Single flash sector or full chip erase in 400 ms and programming of 256 B in 1 ms
- USB 2.0 full-speed compliant device controller with 2 kB of endpoint RAM
- Low power Real-Time Clock (RTC) with independent power and 32 kHz clock input

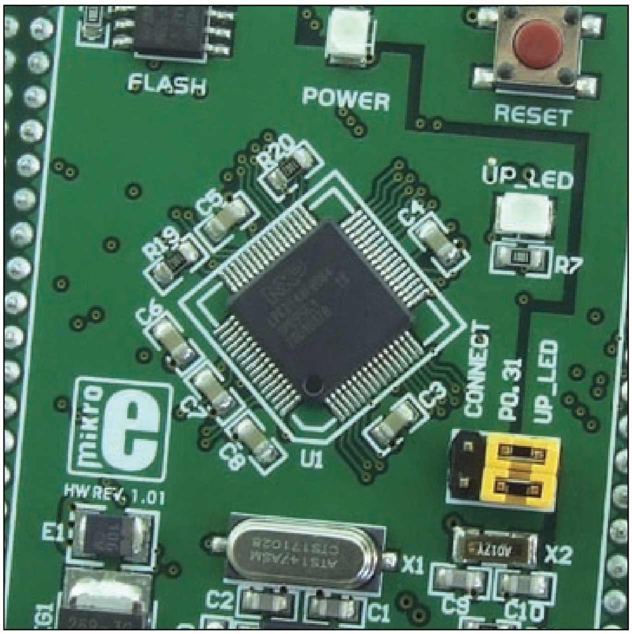


Figure 2-1: LPC2148 microcontroller

The LPC2148 is connected to on-board modules via pins which are also connected to the CN1 and CN2 connectors. These two connectors enable the board to be connected to the EasyARM v6 development system or some other device.

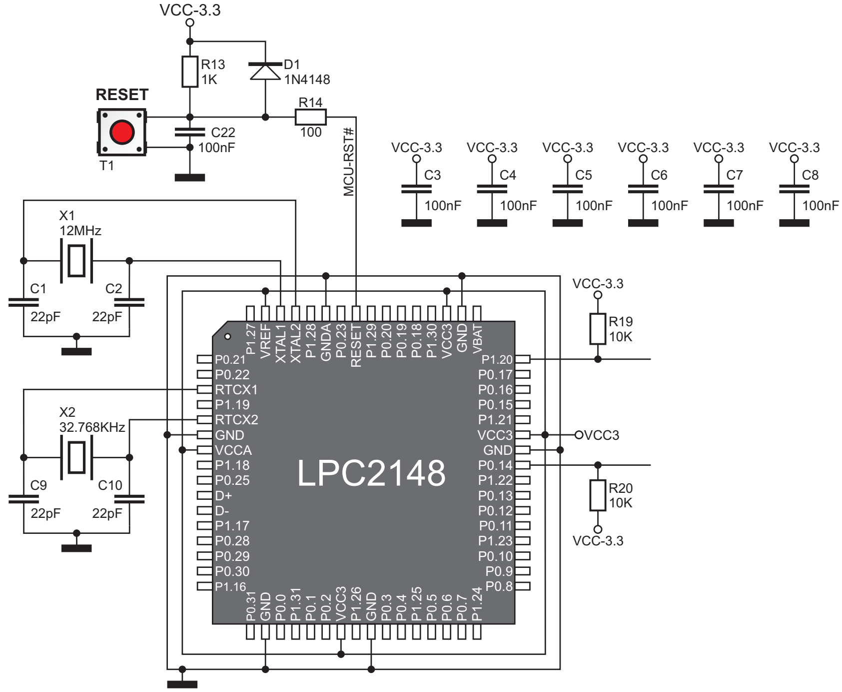


Figure 2-2: LPC2148 microcontroller with oscillators connection schematic

The LPC2148 microcontroller is connected to the X1 and X2 oscillators. The X1 oscillator generates a clock used for the operation of the microcontroller, whereas the X2 oscillator is used for the operation of the RTC module built into the microcontroller. The microcontroller can be cleared by feeding the reset pin with a logic 0, i.e. by pressing the RESET button.

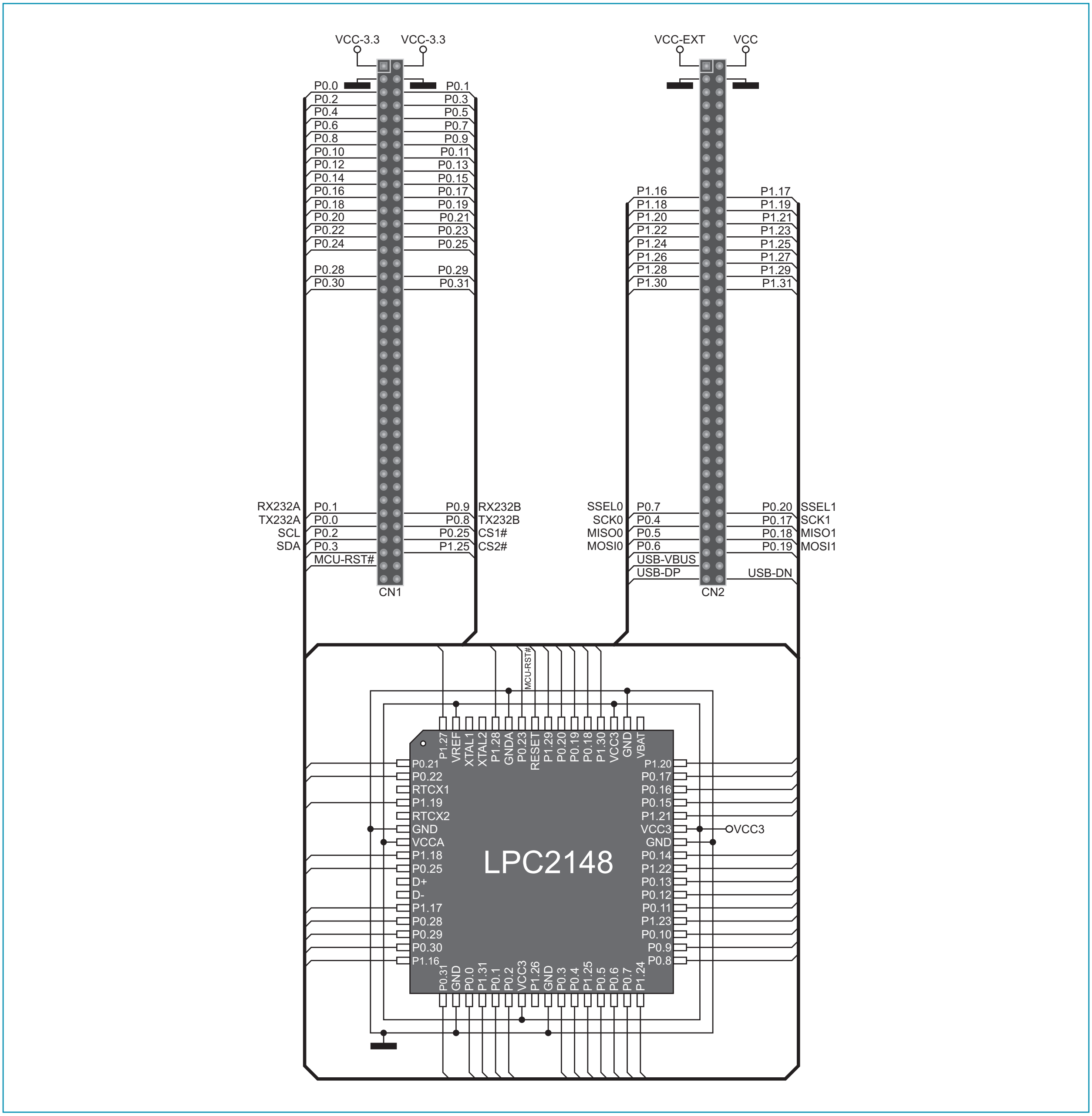


Figure 2-3: LPC2148 microcontroller with connectors connection schematic

3. Programming the microcontroller

The microcontroller can be programmed with a bootloader or the JTAG programmer. The use of bootloader is enabled due to the bootloader code that is loaded into the microcontroller. In order to program the microcontroller with the bootloader, it is necessary to connect the board to a PC via the CN3 connector and USB cable, figure 3-1. A .hex code is transferred from the PC to the microcontroller by using some of the bootloader programs, such as Flash Magic.

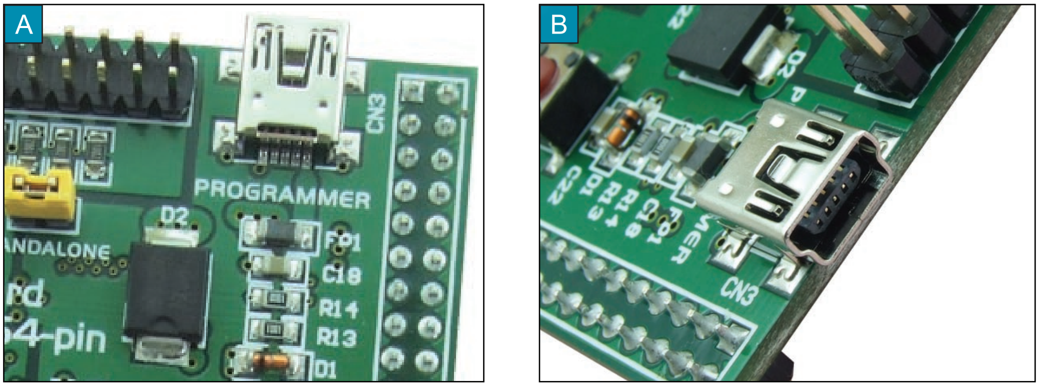


Figure 3-1: USB connector for programming

The CN3 USB connector is connected to the UART module built into the microcontroller via FTDI module (FT232RL).

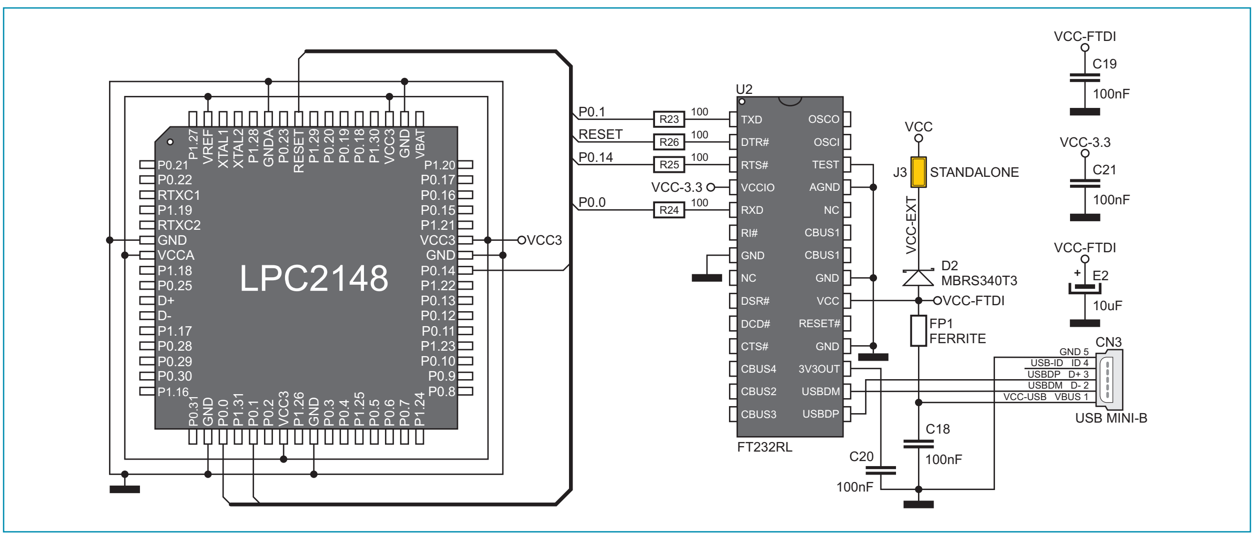
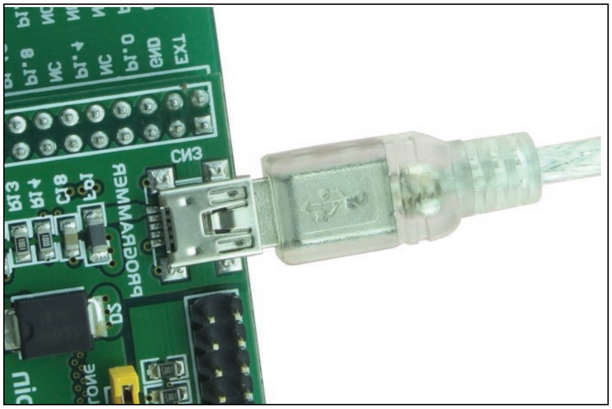


Figure 3-2: USB UART module connection schematic

When the mikroBoard for ARM 64-pin operates as a stand-alone device, it is necessary to place jumper J3 on the board. If the board is connected to the EasyARM v6 development system, jumper J3 should be removed.

The following steps explain how to program the microcontroller with bootloader via the Flash Magic application.

STEP 1: Connect the system to a PC



Connect the mikroBoard for ARM 64-pin to available USB port on your PC.

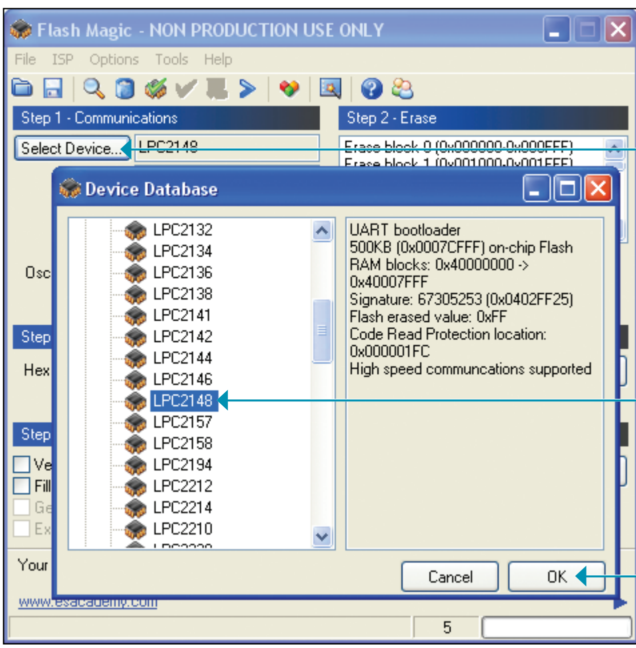
STEP 2: Start Flash Magic

Download the Flash Magic application from http://www.flashmagictool.com/download.html&d=FlashMagic.exe and install it on your PC.
When the installation is finished, double click on the Flash Magic icon



Flash Magic

STEP 3: Select MCU

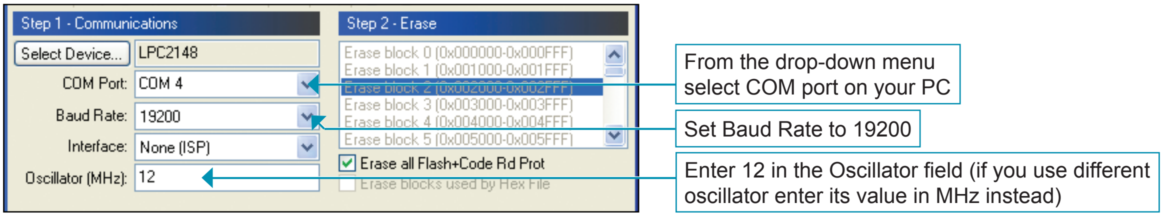


Click on the Select Device button

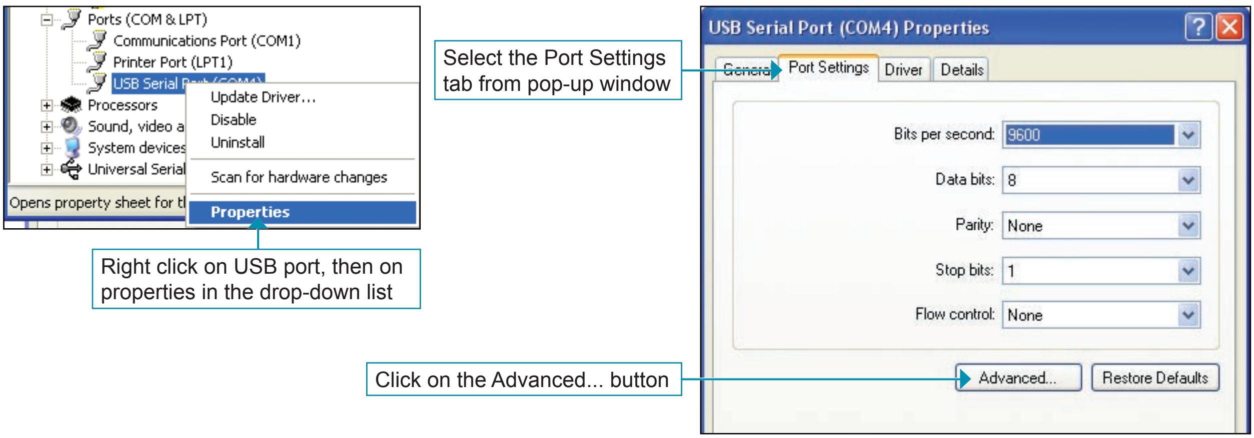
Select MCU from the list

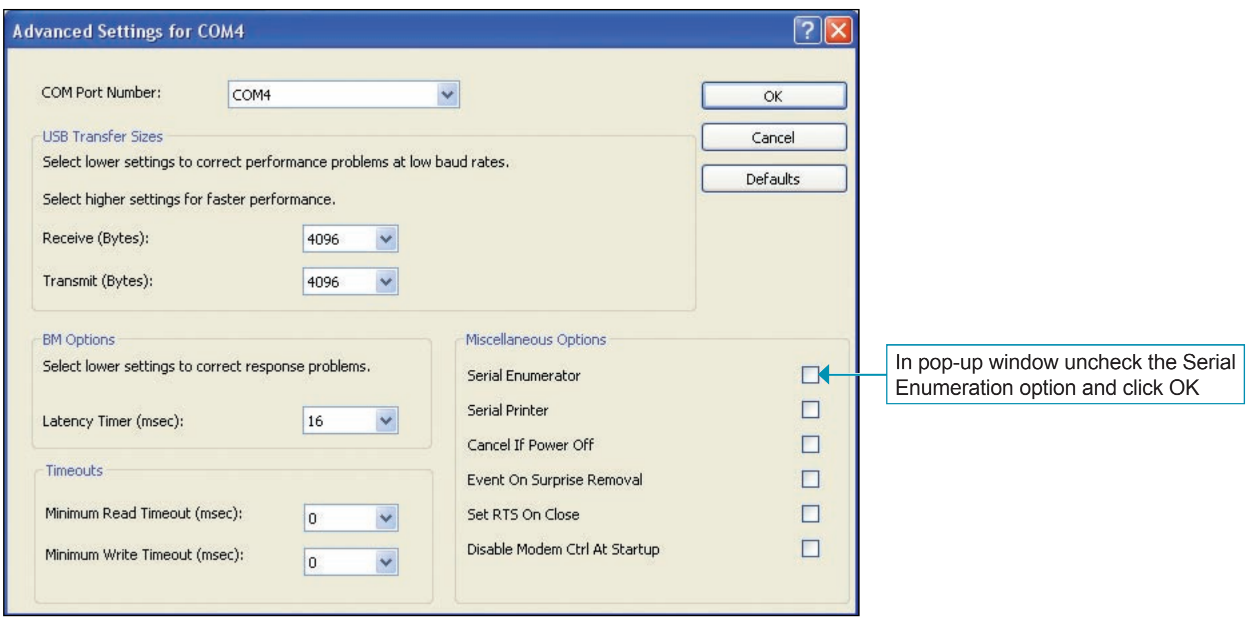
Click OK

STEP 4: Settings

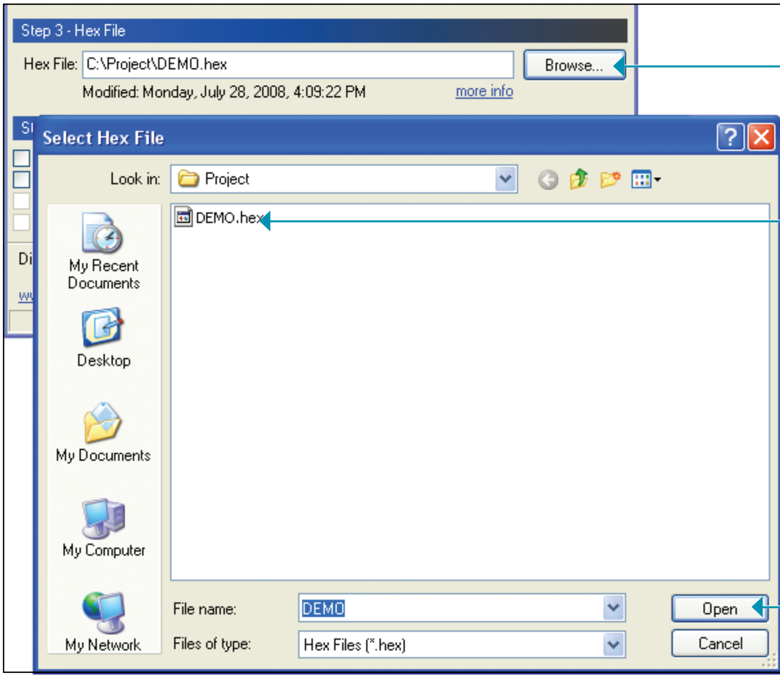


Device Manager on your PC contains information on which COM port is used for USB communication with the mikroBoard for ARM 64-pin. In this case the COM4 port is used.





STEP 5: Browse for .hex file



Click on the Browse button

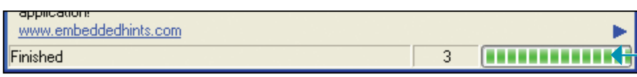
In pop-up window select the appropriate .hex file

Click on the Open button

STEP 6: Upload .hex file



Click Start to begin .hex file upload



After progress bar becomes green programing is finished

The microcontroller can also be programmed with the JTAG programmer, Figure 3-3. In addition, this programmer can also be used to test the operation of the microcontroller.

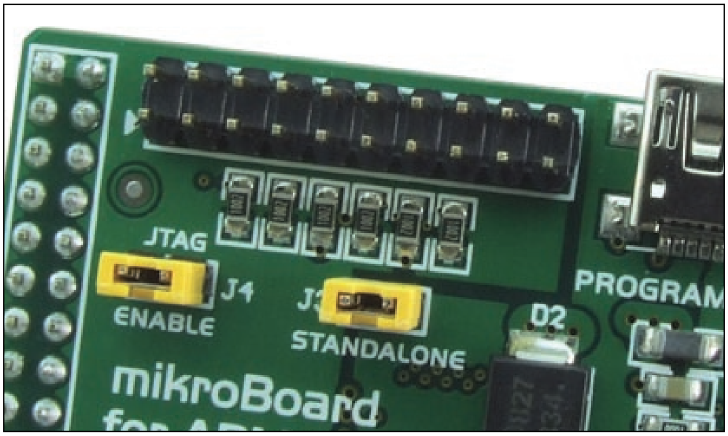


Figure 3-3: JTAG connector

In order to enable the JTAG programmer to be used, it is necessary to place jumper J4 in the ENABLE position, Figure 3-5. If the JTAG programmer is not used for programming, jumper J4 should be removed from the board, Figure 3-6.

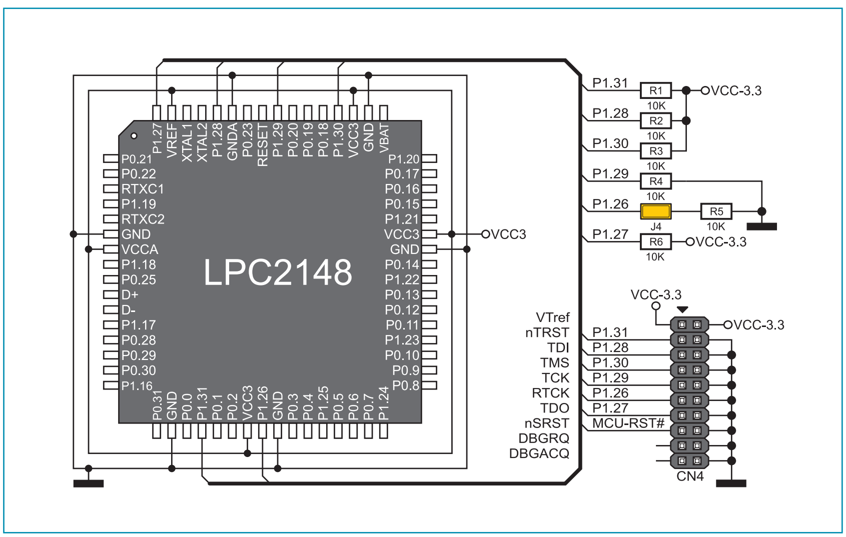


Figure 3-4: JTAG module connection schematic

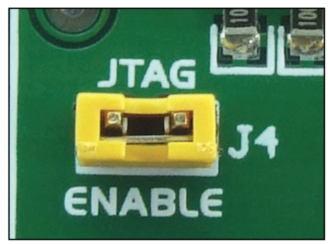


Figure 3-5: JTAG is enabled

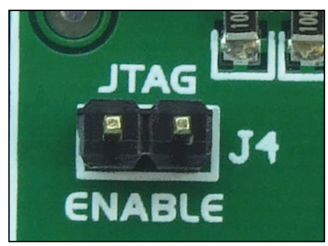


Figure 3-6: JTAG is disabled

4. Voltage regulator

The on-board microcontroller operates at 3.3V power supply voltage. The board is powered with the 5V power supply voltage via the CN3 USB connector.

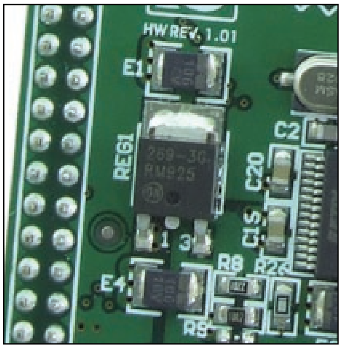


Figure 4-1: Voltage regulator

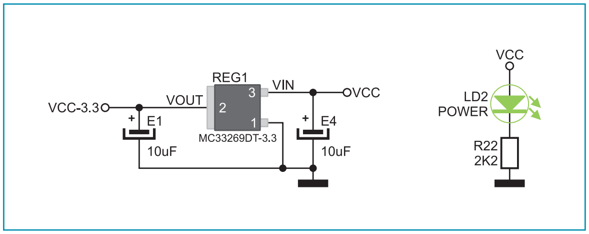


Figure 4-2: Voltage regulator connection schematic

If the board is powered by a development system (EasyARM v6), the function of the voltage regulator remains the same. In this case, it is necessary to remove jumper J3 (STANDALONE), Figure 4-3.

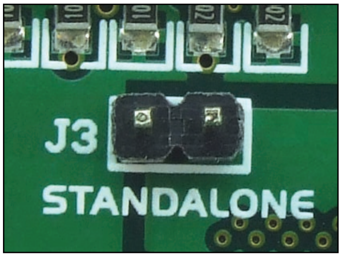


Figure 4-3: Standalone mode disabled (development system connection)

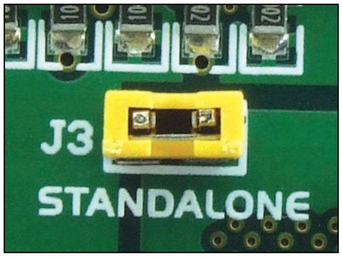


Figure 4-4: Standalone mode enabled

5. MicroSD connector

There is a connector CN5 provided on the development sysem that enables the use of microSD card. When inserted, the microSD card provides additional memory space that the microcontroller can use to store data. Communication between the microSD card and the microcontroller is performed via the Serial Peripheral Interface (SPI).

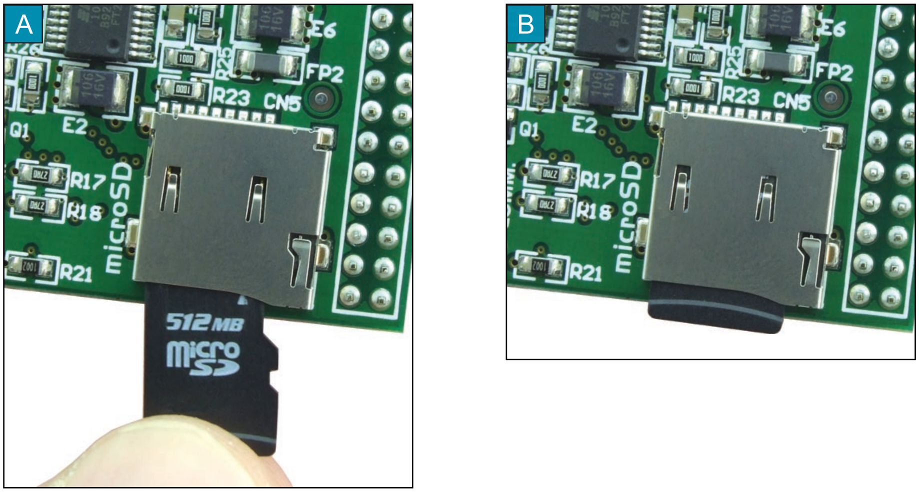


Figure 5-1: microSD connector

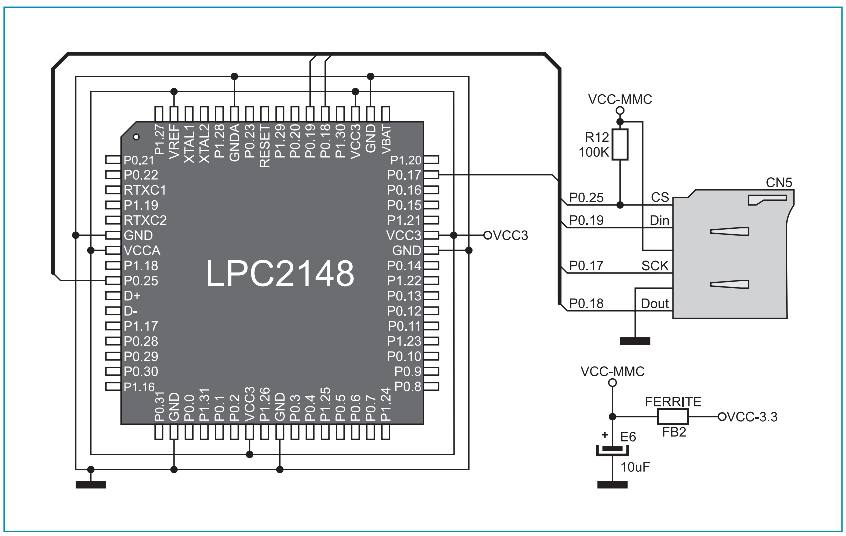


Figure 5-2: microSD connector connection schematic

The pins’ designations have the following meaning:

CS   - Chip Select
SCK - Clock
Din - Master Out/Slave In (MOSI)
Dout - Master In/Slave Out (MISO)

6. Flash module

Flash module provides additional 8Mbit of flash memory that the microcontroller can use via the Serial Peripheral Interface (SPI).

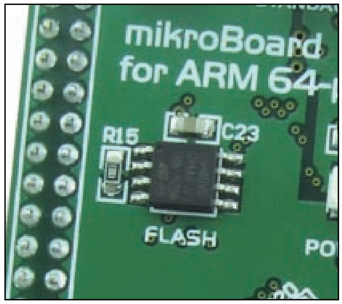


Figure 6-1: Flash memory

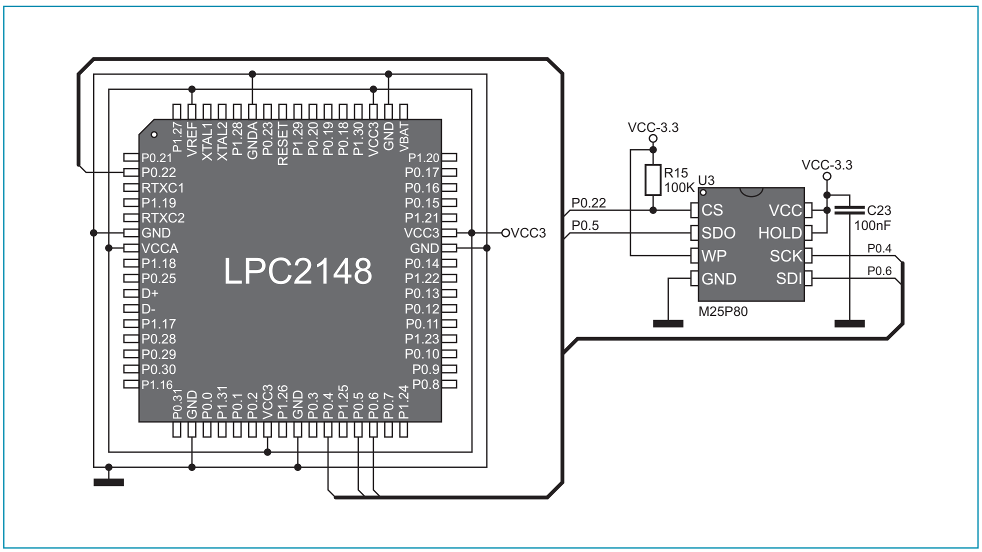


Figure 6-2: Flash module connection schematic

7. USB communication

The USB connector CN7 enables USB devices to access the microcontroller. When connecting USB devices, jumpers J1 and J2 are used to determine whether the UP_LED or soft connect function will be active. When jumpers J1 and J2 are placed in the UP_LED position, a LED marked UP_LED (LD1) will illuminate if the connected USB device is configured. If the connected USB device is not configured, this LED will not illuminate. If jumpers J1 and J2 are placed in the CONNECT position, an external resistor of 1.5K will be automatically controlled by the software, thus enabling the soft connect function.

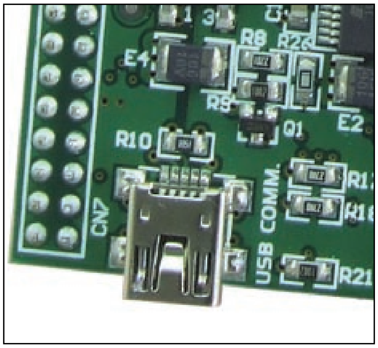


Figure 7-1: USB connector

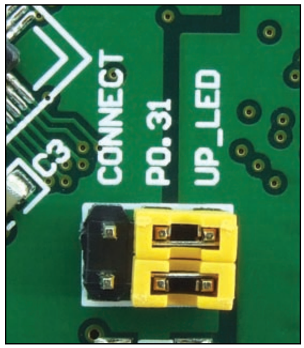


Figure 7-2: UP_LED function

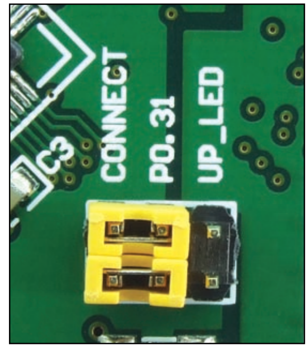


Figure 7-3: Soft connect function

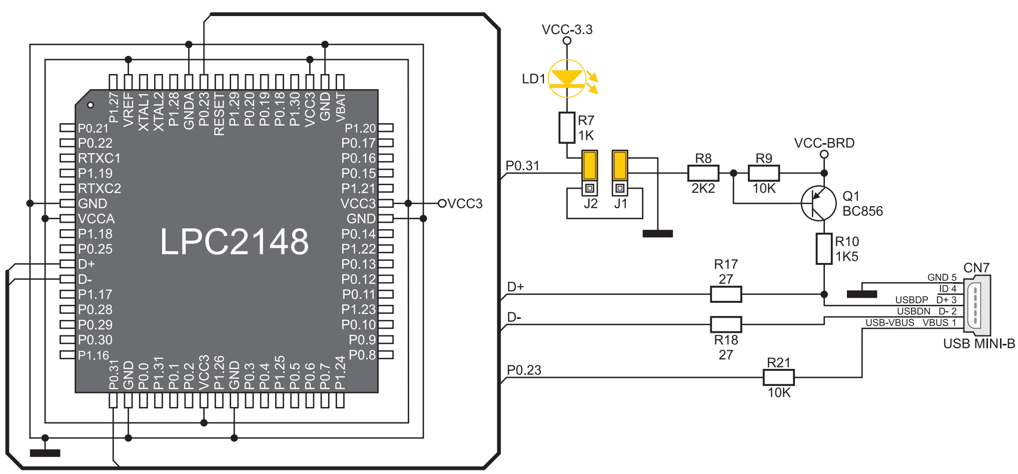


Figure 7-4: USB connector connection schematic

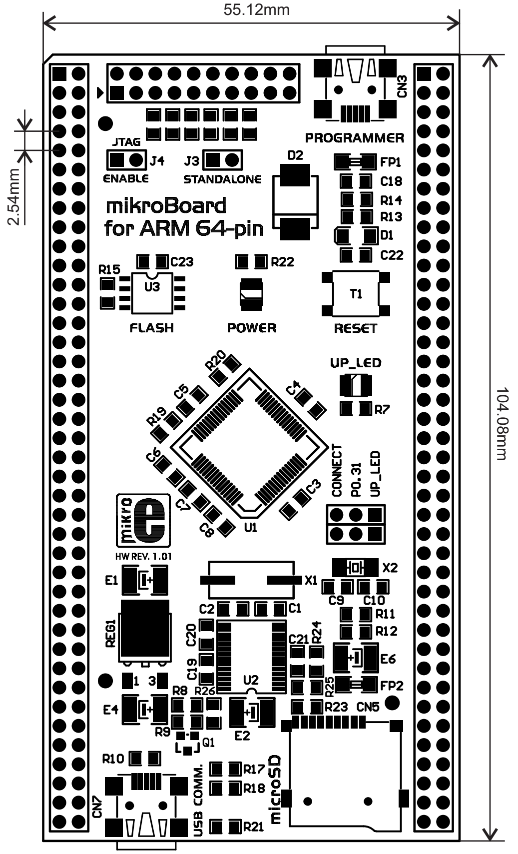


Figure 7-5: Dimensions of the mikroBoard for ARM 64-pin

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